We shall have occasion in the future to further consider this interesting matter, in order to point out that at certain epochs of increased spot activity the resulting solar cathode ray influences produce special ring phenomena about the sun. In meteorological optics, however, these peculiar solar aureole displays will assume a special position, and later theory will have to discuss them in more detail.

A few years ago it was pointed out that there is a supposed relation between solar activity and certain phenomena in atmospheric optics. Jensen and Busch in their fundamental work [7] have attempted to further establish the opinion, expressed by Busch as early as 1893, that there is perhaps a paralellism between the secular march of the neutral points of Arago and Babinet and that of the solar activity. From the preceding paragraphs it is scarcely to be doubted that, particularly about the time of the maximum in periods of specially augmented activity, this relation actually does exist. A close comparison, as nearly synchronous as possible, between regularly executed observations of atmospheric polarization and the momentarily existant solar activity will also bring to light many interesting features. But much depends on the relative direction from which the solar emanation impinges on the earth's field and the atmosphere, and on the atmospheric conditions found at the different points on the earth. There are often considerable *local* variations in the individual forms of the phenomena.

AURORA OF JUNE 16–17, 1915.

By DOUGLAS F. MANNING.

[Dated: Alexandria Bay, N. Y., June 20, 1915.]

Several days ago I sent you a few observations on an aurora and I thought that you might be interested to learn that on the following evening there occurred a much more pronounced display which, from the inclosed clipping, must have been quite general.

[Clipping from ——.]

NEW YORK, *June 17, 1915.*—The electrical disturbance caused by the aurora borealis in the northwest last night [June 16, 1915] had a serious effect on cable and telegraph lines in the northeastern part of the United States and eastern Canada. For several hours during the early morning cable communication via the Newfoundland cables of the Western Union was all but paralyzed and the disturbances, although they diminished, were still felt up until the late afternoon.

A peculiar feature of the phenomenon was that only east and west wires were affected. Interruptions in land-line service were frequent, the wires being heavily surcharged with electricity.

The telegraph systems of the Commercial Cable Company and of the American Telephone & Telegraph Company were similarly affected. Officials of the latter company said the disturbance was felt as far south as Pittsburgh and particularly around Buffalo, although the interruptions were of short duration. * * *

The disturbance was not unprecedented, * * * but nothing so severe had occurred in 11 years.

On the evening of June 17 the aurora appeared in patches of greenish light without any particular formation, but it seemed much closer to the earth than I have ever seen it. The patches of light extended all over the northern sky, reaching overhead and occasionally to the south of the zenith; the leading feature was the tremendous speed of the light "waves" which would continually flash up from the north, the different patches lighting up and fading out in quick succession; sometimes one of the patches would show a tinge of red and yellow when at the height of its brilliancy. There were no clouds whatever present. * * * The local wireless man here had great difficulty in securing his evening reports, he claims. During the evening I turned my compass so that the needle read due north and south on its card, and on the following morning I noted that the needle pointed about 2° east of north; I am very sure that no one could have disturbed the compass box to cause the variation.

The following morning the sky was streaked with cirrus streamers, as I have so often observed after an auroral display, and it really seems as though there were some connection between the two. The cirrus streamers generally follow an aurora and are not always present during the display; the sky on the evening in question was absolutely clear and right in the heart of a "high."

[7] *Busch & Jensen.* Tatsachen und Theorien der atmosphärischen Polarisation. Hamburg, 1911. 8°.

AURORA OF JUNE 16–17, 1915, AT ASHLAND, OHIO.

Mr. S. W. Brandt, our cooperative observer at Ashland, Ohio, sent to the Weather Bureau office in Columbus, Ohio, the following account of the great aurora of the night of June 16–17, 1915:

417 VINE STREET, ASHLAND, OHIO,
*June 16, 1915.**

I am a night watchman and have just come in from the 2 o'clock [a. m. June 17] trip, having had the rare privilege of beholding the most beautiful display of northern lights that I have witnessed for many years.

The sky here has been clear of clouds all night, except a low ridge far to the north [no moon] and the view unobstructed. I first noticed the light in the north as soon as it became dark. At 11 p. m. it became very brilliant, with a primary bow far to the north and a secondary bow about midway between this and the zenith. This secondary bow extended from the far east to the far west. Streamers of white light extended from the primary bow, in a vertical position nearly to the zenith.

It was less brilliant until 2 a. m. when it became more beautiful than at any other time during the night. The secondary bow had disappeared, although the vertical streamers were still playing, and over all these from the primary bow far to the north came great waves of brilliant white light many times reaching to the zenith. They just resembled the waves of the ocean rolling out upon a low beach.

At 2:30 a. m. the secondary bow had again appeared.

At 3 a. m. [June 17] daylight had so far advanced as to render the aurora invisible.

* A later letter shows that this account was written June 17, 1915—C. A., jr.

STUDY OF THE UPPER AIR BY MEANS OF TELESCOPES.

Those of our readers who were interested in the paper by Prof. W. H. Pickering in this REVIEW for October, 1915, will find added interest in a longer article on the subject by Prof. A. E. Douglass published in the American Meteorological Journal for March, 1895 (vol. 11, no. 11). It is regretted that this reference escaped the Editor last month.—C. A., jr.